

Remarks/Arguments

Applicant respectfully asserts that the specification and accompanying drawings, as originally described and filed, enables anyone of ordinary skill in the art of electronic displays to practice the invention as claimed. Applicant respectfully submits that the Examiner may be misapprehending the present invention, which prevents the Examiner from fully appreciating the inventive aspects of the same.

Applicant respectfully asserts that the display of an image that appears to be three dimensional is possible. In short, the present invention takes advantage of the ability for humans to perceive depth by comparing inputs from both eyes at the same time. Additionally, like regular video displays such as computer monitors and televisions, the present invention takes advantage of human *persistence of vision*.

The moving aperture described and claimed is separated from the display surface by a gap (see FIGs 3 & 4). The display screen does not show a complete two dimensional representation of the displayed object on the display surface through the aperture. This aperture allows a viewer to *perceive* a separate and different portion of a display surface with each eye (see FIGs 3 & 4). As different apertures are opened in sequence (see p12, line11 - page 13, line 4), the two dimensional image displayed on the display surface is changed (see p13, lines15-16; FIG 8). At some point in the aperture opening sequence, the left eye will see a point on the displayed object that the right eye saw in a previous aperture opening in the sequence. Since each aperture opening reveals a different image on the image display surface, the brain interprets the differences seen by each eye in perspective, parallax, etc., relative to the point in the viewed object as a spatial

relationship (see p17, lines 7- 21). This is how the present invention gives the *perception* of depth.

This aperture sequencing happens so rapidly that the human eye's persistence of vision treats each individual aperture opening to be part of an illuminated screen. However, since, with each aperture opening, each eye of the viewer sees a different portion of the display surface, the respective eyes see different images. As discussed above, it is these differences perceived by each eye that allows the viewer to convince their brain that the objects being displayed are in three dimensions.

Once all of the apertures on the screen have opened in sequence, displaying a set of associated images, the process is repeated. Each aperture opening sequence is equivalent to a frame of film in a movie or on a television.

The display of the present invention differs from traditional stereoscopic 3D technologies. These traditional stereoscopic technologies allow a viewer to see an entire frame or picture, which includes the data intended for both eyes at the same time. The data for each eye is then filtered for each eye, the offset of the data giving the impression of three dimensionality (see p2, lines 13-22) .

This effect is most commonly seen in the Anaglyph method, there a pair of special glasses, with one lens red, and the other lens blue, is used to view the stereoscopic image (see p2, lines 1-4). The blue lens, on one eye, filters out offset image rendered in blue, allowing one eye to see all of the image *except* the blue light data. The other, red lens is on the other eye, and filters out an offset red image, allowing the viewer to see all of the image data *except* the red. Since the red and blue offset images do not coincide, the

viewer's brain sees these offset images as being at a different depth from the main image data, allowing the viewer to perceive some depth to the image.

Additionally, Applicant respectfully requests that the Examiner note that FIGs 9a-9c are not meant to create the impression that the present invention actually creates a representation of the displayed object in midair. Rather, these FIGs merely illustrate that objects displayed by the present invention could be selectively focused on the viewer's eyes in such a way as to give the *impression* that the displayed object was at various distances from the device of the present invention (see p19, lines 19 - p20 line 4).

Examiner's objections under 35 U.S.C. §132(a)

The Examiner has objected to claims 1, 21, 27, 29, 42 and 57 under 35 U.S.C. §132(a) for including new matter not disclosed in the application specification. Specifically, the Examiner states that including the phrase "a displayed 3D image" is impermissible, based on the Examiner's assertion that displaying a 3D image is impossible. In light of the above discussion, Applicant respectfully asserts that it would in fact, be possible for a three dimensional display device to display a 3D image as described in the original specification. The phrase "a displayed 3D image" in claims 1, 21, 27, 29, 42 and 57, would, therefore, not constitute new matter. Applicant respectfully requests the Examiner's withdrawal of the objection to claims 1, 21, 27, 29, 42 and 57 under 35 U.S.C. §132(a).

Examiner's rejection under 35 U.S.C. §112

The Examiner has also rejected claims 1-52 and 57-67 under 35 U.S.C. §112, first paragraph. The Examiner states that since displaying a 3D image is not possible, that the rejected claims fail to enable a person skilled in the art to make and use the invention. Applicant respectfully traverses this rejection.

Applicant respectfully draws the Examiner's attention to MPEP §2164.04, which states:

“A specification disclosure which contains a teaching of the manner and process of making and using an invention in terms which correspond in scope to those used in describing and defining the subject matter sought to be patented must be taken as being in compliance with the enablement requirement of 35 U.S.C. 112, first paragraph, unless there is a reason to doubt the objective truth of the statements contained therein which must be relied on for enabling support.”

Applicant further draws the Examiner's attention to MPEP §2106, paragraph VII., which states:

“Once Office personnel have concluded the above analyses of the claimed invention under all the statutory provisions, including 35 U.S.C. 101, 112, 102 and 103, they should review all the proposed rejections and their bases to confirm their correctness. Only then should any rejection be imposed in an Office action. The Office action should clearly communicate the findings, conclusions and reasons which support them.”

Applicant respectfully asserts that the claims of impossibility made by the Examiner have been made without any stated basis. Applicant firmly believes that simply claiming that something is impossible in this manner is improper under MPEP §2106.

However, in the interests of cooperation, clarity, and completeness, Applicant respectfully submits the following additional arguments in support of Applicant's traversal of the Examiner's rejection under 35 U.S.C. §112, first paragraph.

Again, Applicant relies on the foregoing discussion of the merits of the present invention to assert that a three dimensional display device can display a 3D image. This discussion clearly shows that the inventor was in possession of the claimed invention at the time of the original application. Furthermore, Applicant respectfully asserts that one of ordinary skill in the art of electronic display devices, specifically, three dimensional display devices, would have an ample direction from the originally filed specification in the making and use of the present invention.

The Examiner states that the display of a 3D image by the present invention is impossible because the present invention lacks *certain optics* to ensure that the left eye perspective image goes to the left eye, and the right eye perspective goes to the right eye.

The prior discussion of the technical merits of the present invention centers around the moving aperture of the present invention, which is a critical inventive aspect of the invention. The aperture is situated in such a way as to allow a viewer to view only a small portion of the display surface behind the aperture plate with the left eye, and a discrete, yet different, portion of the image display screen with the other eye. This use of the aperture obviates any need for special optics.

The Examiner has further argued that the present invention will not provide different perspectives viewable from multiple different user viewing angles, and that the present invention will not be able to exhibit both horizontal and vertical parallax.

Applicant again asserts that the aperture on the aperture plate provides ample unique and different viewer perspectives along both the horizontal and vertical axis. Applicant respectfully refers the Examiner to FIGs. 3, 4, 7, 8, 18 and 19. In particular, FIGs. 3 and 4 show how the aperture plate would create a multitude of different user viewing angles. The indicator DISCREET ANGLES in FIG. 4 points to other places a viewer's eyes may be physically positioned while viewing the display device of the present invention. Since the open aperture is of a size and arrangement to restrict the viewer to seeing only a small portion of the display surface at any one time, a viewer who physically moves about the OBSERVER PLANE of FIG. 4 would necessarily see a different portion of the display surface through the aperture. As the aperture plate closes the open aperture, and opens a new aperture, the display surface changes the data displayed to new data, suitable for viewing from all viewing angles. The newly opened aperture then allows a viewer to see another minute portion of the display surface with the new data. This happens so fast, and in sequence, that the human persistence of vision sees all of the apertures open at the same time, but showing portions of a multitude of different displayed images.

Referring now to FIGs. 12 and 13, the use of apertures dimensioned as small squares, indicated as SHUTTER PINHOLES in FIGs. 12 and 13 allow viewing angles to be created along both the vertical and horizontal axis. This is the vertical and horizontal parallax of the rejected claims. This use of a two dimensional grid of small, pinhole style

shutters is in contrast to another embodiment of the present invention, exemplified in FIG. 11. FIG. 11 illustrates the use of a shutter “slit” instead of a pinhole shutter. The disadvantage of the shutter slit is that the 3 dimensional effect only changes when the viewer moves along the axis perpendicular to the shutter slit orientation, i.e., horizontally.

As embodied by the aperture plate of FIGs. 12 and 13, the present invention, *does* allow for multiple viewing angles along the horizontal and vertical axis. Applicant, therefore, respectfully requests that the Examiner rescind the rejection of claims 1-52 and 57-67 under 35 U.S.C. §112.

Examiner’s dispute of the use of the term hologram

The present invention takes advantage of the stereoscopic nature of human vision. It is the difference of views between an observer’s right and left eyes that allow a viewer to perceive depth. However, the present invention is not stereoscopic in the traditional sense of the term when applied to three dimensional displays. Applicant respectfully draws the Examiner’s attention to pages 2 and 3 of the specification, which details popular current “stereoscope” methods. Some of these methods, such as the anaglyph and polarized filter methods are commonly used for 3D movies such as “Jaws 3D”. As discussed above, the drawbacks to these methods are that they require special glasses to view, and only provide a single perspective view. The special glasses used by these methods block visual data to one eye or another selectively, i.e. right eye data blocked from left eye, and left eye data blocked from right eye. The present invention does away with the need for special glasses, as the data for the right and left eye are transmitted through the aperture at different angles. And it is the transmission of right and left eye

data through the aperture at many different angles to the display device that allows many different viewing perspectives.

This transmission of left and right eye data at different angles is the basis for holography. While the data actually displayed on the display surface of the present invention is not a hologram, the *effect* is holographic in nature. The use of the term hologram is not meant to indicate that the display surface shows what is traditionally thought of as a hologram. To do so would eliminate one of the most distinctive features of the present invention, multiple perspective viewing angles.

Applicant regrets any confusion this may have caused the Examiner, and respectfully asserts that the three dimensional display device claimed produces a holographic effect, namely giving the viewer the impression that the objects displayed have some depth to them.

Examiner's objection to the term "solid state three-dimensional device"

The Examiner has objected to the term "solid state three-dimensional device", claiming that there is no support in the specification for such a device. Any instances of the phrase "solid state three-dimensional device" in the claims are intended to be presented as a "solid state three-dimensional *display* device."

Respectfully, Applicant does not currently claim a "solid state three-dimensional device." However, any instances of such a term in the claims are unintentional, and Applicant would be amenable to correcting this oversight to read "solid state three-dimensional *display* device", should the Examiner find such.

Examiner's objection to claims 11-12 under 35-U.S.C. 112

Applicant has amended these claims to clarify the same.

Examiner's objection to term "viewable operating range up to 180 degrees" under 35 U.S.C. 112

The Examiner has objected to various claims 28, 30, 50, 52, 65, 67, 73 and 75 as not being enabled by the specification under 35 U.S.C. 112. Specifically, the Examiner states that "the parallax of angular viewing the images may not exceed the viewing angle between the two eyes of the observer, which is a very narrow angle."

Applicant respectfully asserts that parallax in this situation has nothing to do with the "viewing angle between the two eyes of the observer." Instead, the parallax is created by the screen. The aperture plate allows each eye to see a different portion of the screen. The claims objected to recite a parallax, which has a viewable operating range of 180 degrees. This means that parallax exists for 180 degrees in front of the display device.

In light of this clarification, Applicant respectfully requests that the Examiner withdraw the objection to these claims.

Examiner's objection to claim 76 use of the phrase "a hybrid screen" under 35 U.S.C. §112

The Examiner has objected to claim 76 as being non-enabling, which claims a three dimensional display device utilizing a hybrid screen.

The Applicant respectfully draws the Examiner's attention to page 20, lines 18-19; page 21, lines 2-4; FIG 14; and page 40, line 21- page 41, line 2. For instance, Figure

14 shows a hybrid system using multiple LCD video projectors back lit by sequenced strobe lights being used as an alternative to a single high-speed display screen. The term hybrid here is used to describe a display apparatus that is not a single projector or screen by itself. This use of the phrase agrees with the definition of hybrid found in *The American Heritage® Dictionary of the English Language, Fourth Edition*: “Something, such as a computer or power plant, having two kinds of components that produce the same or similar results.”

Applicant respectfully requests that the Examiner withdraw the objection to the use of the term hybrid in claim 76.

Examiner's objection to unspecified claims based on unspecified errors under 35 U.S.C. §112.

Applicant disputes the Examiner's assertion that “the claims are full of errors that make the device a non-enabling device.” (Office action of 05/26/2006, page 5). Applicant respectfully draws the Examiner's attention to MPEP §2164.04, which states in part, “examiner must provide a reasonable explanation as to why the scope of protection provided by a claim is not adequately enabled by the disclosure.”

No support for any errors in the claims, other than those discussed in this paper's other sections, have been given in the Examiner's objection. Applicant, therefore, respectfully requests the withdrawal of this rejection.

Examiner's Objections to claims

The Examiner has objected to the phrase “different perspectives of a displayed 3D image viewable from respective multiple different user viewing angles” used in claims 1, 21, 27, 29, 42 and 57. Applicant respectfully traverses the Examiner’s objection.

In the present invention, for reasons discussed at length in the initial discussion, the separation of the aperture plate from the display surface by a gap allows the device to present different information to a viewer based on the viewer’s position along the observer plane (see FIG. 4). For instance, viewers at two different positions along the observer plane will be able to see different parts of the display surface through the aperture, which would give each viewer a different perspective. These viewers would be at different user viewing angles, and the capability to show the users different perspectives of the displayed image. For a further discussion of this subject, Applicant respectfully refers the Examiner to the initial discussion of the merits of the invention contained in this paper.

Based on the foregoing, Applicant respectfully requests that the Examiner withdraw the objection to claims 1, 21, 27, 29, 42 and 57.

Examiner's objection to use of the term sequencing on claim 2

The Examiner has objected to the use of the phrase “control system controlling sequencing of said display screen and said aperture plate to produce a three-dimensional image.”

Applicant respectfully asserts that sequencing of the display screen and the aperture plate *is* necessary for the proper operation of the present invention.

First, the aperture plate sequencing must be controlled. The apertures must be opened in a particular order, and only certain apertures can be open at the same time to achieve the desired three dimensional effect (see page 24, lines 15 – page 25, line 11; FIG 15).

Second, each aperture must be opening in a manner where the timing of the aperture opening coincides with the display of certain visual data for the particular open aperture. Put simply, the display surface shows a separate image each time an aperture is opened (see page 13, lines 13-21).

The present invention must be capable of synchronizing the image data, timing and location of the aperture openings. Applicant respectfully asserts that this has been fully disclosed within the specification, and as such, would allow a person of normal skill in the art to easily make and use the present invention. Therefore, Applicant respectfully requests that the Examiner withdraw the objection to claim 2.

Examiner's objection to claim 5

The Examiner has objected to claim 5, stating that the aperture plate will have apertures, but may not produce a slit aperture, and that the phrase “capable of” is indefinite.

The aperture plate may be configured to open more than one aperture at the same time (see FIG. 15). If these multiple apertures are arranged in a continuous vertical line, they would form a slit. The aperture plate would then have formed a slit aperture.

The claim language in claim 5 that the aperture plate be capable of producing a slit aperture means only that the aperture plate can produce something other than a slit aperture, i.e. the aperture plate is not required to *only* produce slit apertures. In the present invention, the aperture plate may produce a pinhole and/or slit aperture. From the specification's above cited description of opening multiple pinhole type apertures and the specification's discussion of slit apertures, it would be obvious to one of normal skill in the art that a slit aperture could be formed by opening multiple adjacent pinhole apertures to form a slit aperture.

Based on the foregoing, Applicant respectfully requests that the Examiner withdraw the objection to claim 5.

Examiner asserts claim 9 is wrong

The Examiner has objected to claim 9, and asserted that claim 9 is wrong. The Examiner states that having the same number of apertures on the aperture plate as there are pixels on the display surface obviates the ability to produce a 3D image.

Applicant respectfully asserts that the Examiner has misapprehended the operation of the present invention. Not every aperture need be open at the same time. In fact, to do so would merely replicate a television. In the present invention, the majority of apertures are, in fact, closed at any given time (see FIGs. 12 and 13). An aperture is opened in sequence, and then closed again before the next aperture is open. Each open aperture allows each eye of a viewer to perceive a different part of the viewing surface.

The claim that the number of apertures is equal to the number of pixels on the screen is of no consequence when determining whether the present invention is capable

of displaying three dimensional images. The critical issue, as discussed immediately precedent, is the number of open apertures. Claim 9 makes no reference to limiting the number of apertures open or closed at any one time.

Therefore, Applicant respectfully requests the Examiner's withdrawal of the objection to claim 9.

The Examiner objects to the term "solid state scan type"

The Examiner has objected to the term "solid state scan type" and "solid state type" in various claims as confusing and indefinite. Applicant respectfully draws the Examiner's attention to the specification page 16, line 10 through page 37, line 3, which contains a detailed discussion of the solid state system and scan types contemplated by the present invention.

Solid state is a term used in the electronics industry for almost 60 years to describe an electronic circuit or device that does not contain vacuum tubes, being fully transistorized. More recently, solid state has also come to mean that an electronic device does not contain any electrically operated moving parts.

In the present invention, solid state uses the plain English meaning of the phrase, one that is commonly used and obvious to those of normal skill in the art of electronic devices in general.

From page 36, lines 10-11 of the specification: "Scan type describes the means by which an aperture is rapidly translated across a viewer's field of view." Therefore, a solid state scan type would merely be a aperture plate that uses solid state electronics to open and close the apertures.

Based on the foregoing discussion, the Applicant respectfully requests that the Examiner withdraw the objection to the use of the phrases “solid state scan type” and “solid state type”.

The Examiner’s objection to claim 41

The Examiner has objected to the phrase “a number of vertical viewing angles is less than a number of viewing angles.” Applicant respectfully draws the Examiner’s attention to claim 41, which actually claims “a number of vertical viewing angles is less than a number of *horizontal* viewing angles.”

Applicant refers the Examiner to the exhaustive prior discussions of viewing angles, perspective viewing angles, and the fact the open aperture allows a viewer top perceive a different area of the display surface based on position. Since the position can be changed in both a vertical and horizontal direction, multiple different viewing angles would exists in along both the horizontal and vertical axis.

Applicant respectfully asserts that claim 41 simply claims that the number of different viewing angles achieved along the vertical axis is lower in than the number of viewing angles achieved along the horizontal axis.

In light of the foregoing clarification, the Applicant respectfully requests the withdrawal of the Examiner’s objection to claim 41.

Examiner is confused regarding the term “solid state”

The examiner has objected to the term solid state in various claims. Applicant respectfully reiterates that the plain English meaning in widespread use in the art of the

term “solid state” simply means not electrically controlled moving parts, and no vacuum tubes. As such, Applicant respectfully requests the Examiner withdraw the objection to the use of the phrase “solid state”.

Examiner is objects to the term “hybrid” in claim 76

The Examiner has objected to the use of the term “hybrid” in claim 76 as confusing. The Applicant respectfully refers the Examiner to the extensive discussion of “hybrid screen” under the heading “Examiner’s objection to claim 76 use of the phrase “a hybrid screen” under 35 U.S.C. §112”, and requests the Examiner withdraw the objection to the term “hybrid” in claim 76.

Claims 1-20 stand rejected under 35 U.S.C. §103(a).

The Examiner has rejected claims 1-20 as obvious over the patent issued to Harrold (U.S. Patent No. 5,969,850). Applicant respectfully traverses the Examiner’s rejection, and requests the withdrawal of the 103(a) rejection of claims 1-20.

Harrold is a three dimensional display device that provides only one viewing angle at a time. Applicant respectfully directs the Examiner’s attention to column 1 of Harrold which indicates that an observer tracking system is required for proper operation of the Harrold patent. Additionally, Harrold specifically states in column 1 that the device is a directional display.

In essence, Harrold is nothing more than a device for focusing spatially multiplexed two dimensional images when the viewer moves. This is achieved by

selectively opening the LCD shutters to allow the observer to see relevant parts of the 2D image to construct a 3D image.

In contrast, the present invention creates more than one perspective *simultaneously*. With multiple different perspectives occurring simultaneously, the present invention is neither directional, nor is the present invention limited to a single perspective view.

Claim 1 specifically provides, in part, for “the three dimensional display provid[ing] multiple different perspectives of a displayed 3D image viewable from respective multiple different user viewing angles.” Claims 2-20 depend from claim 1, and therefore incorporate the limitation of multiple different perspectives.

Harold does not teach, or even suggest, being able to view different facets of the viewed image. The portions of Harrold cited by the examiner only refer to the observer being able to properly view the image from a different vantage point. Instead, Harrold merely focuses the same transmitted image to the viewer as the observer moves about, acting as a mere tracking and focusing device.

Furthermore, while Harrold may use some of the same materials as are used in the present invention, this is common in the field of electronics. What Harrold does not teach is the ability to display different perspectives of *the image* to a user. While Harold may allow a viewer “multiple different user viewing angles”, it does not provide the critical step of “provid[ing] multiple different perspectives of a displayed 3D image” as recited in claim 1. It would therefore, not be at all obvious to one skilled in the art of three dimensional display devices to modify Harrold to arrive at the teachings of the present invention.

In light of this discussion, Applicant respectfully requests that the Examiner withdraw the §103(a) rejection of claims 1-20.

Claims 21-52 and 57-91 stand rejected under 35 U.S.C. §103(a)

The Examiner has rejected claims 21-52 and 57-91 are rejected under 35 U.S.C. §103(a) over Harrold in view of the patent to Aritake (U.S. Patent No. 6,061,083).

Applicant has amended independent claims 21, 42, 57, 68 and 76 to clarify the inventive aspects of the same.

Initially, Applicant respectfully asserts that it would not be obvious to one skilled in the art to modify Aritake in such a way as to develop the instant invention. While Aritake may be similar in some respects to the present invention, even when combining the teachings thereof with Harrold, the methods shown differ greatly from the present invention. This difference in methodology is the essence of non-obviousness under §103.

Aritake requires the use of a lenticular lens (FIGs. 42-44) or a rasterizing mirror (FIGS 40-41) in order to properly spread the image to all viewing angles. The advantageous aspects of the present invention require no such lens, as the display surface is visible through each aperture as it opens.

Additionally, Aritake discloses, particularly in FIG. 42, a single pixel being displayed through a single LCD shutter. This teaches away from the present invention, which shows the entire display surface through each individual aperture as it opens, with the portion of the viewing surface visible to the observer dependent on the observer's position.

Hence, Aritake does not show, and in fact, teaches away from “multiple different perspectives of a displayed 3D image which are *simultaneously* viewable from respective multiple different user viewing angles *with respect to an open aperture*” as recited in claim 21. Independent claims 42, 57, 68 and 76 include similar recitations and therefore cannot be considered obvious in view of the combined teachings of Harrold with those of Aritake.

Aritake uses a display method so different from that of the present invention. As such, it is clear that one of ordinary skill in the art would require an undue level of experimentation to eliminate the lens teachings of Aritake and then consider combining the same with Harrold to arrive at the present invention. In light of the above discussion, and clear distinctions between the present invention and the cited prior art, independent claims 21, 42, 57, 68 and 76 are clearly not obvious.

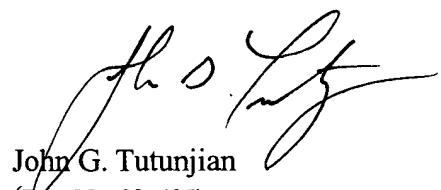
The Applicant respectfully requests the withdrawal of the §103(a) rejection of claims 21-52 and 57-91.

Conclusion

Based on the foregoing discussions and clarifications, reconsideration and withdrawal of the rejections is respectfully requested, and the application be passed to allowance, and letters patent issued in due course.

In the event that any additional fees or charges are required at this time in connection with the application, they may be charged to applicant's representatives Deposit Account No. 50-1433.

Respectfully submitted,
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